Elective		Multimedia Systems	3-0-0-3

Prerequisite: Data Structures, Basic Computer Networks.

1. Objectives: The course will familiarize the students with the basic concepts of multimedia systems and standards. It will build a solid background in multimedia for their academic researches or industrial applications.

2. Syllabus:

Unit - 1 [4 Hours]: Introduction to Multimedia, Multimedia Data Representation, Components of Multimedia Systems.

Unit - 2 [6 Hours]: Text: Visual Representation, Digital Representation, File Formats: RTF, TIFF, Digital Image: Digital Image Representation (2D format, resolution), Color Models.

Unit - 3 [6 Hours]: Digitization of Video, Types of video signals (component, composite and Svideo), 3D Video and TV, Basic Sound Concepts: computer representation of sound, File Formats – WAV, MPEG Audio, Quantization and Transmission of Audio: PCM, DM, DPCM.

Unit - 4 [8 Hours]: Lossless Compression Algorithms: Run-Length Coding, Variable-Length Coding (Huffman Coding, Adaptive Huffman Coding), Arithmetic Coding, Adaptive Arithmetic Coding, Dictionary-Based Coding, Context-based Coding, Lossy Compression Algorithms: Standard Image Compression Techniques (JPEG, JPEG 2000), Video Compression Technique (MPEG).

Unit - 5 [8 Hours]: Fundamentals of data communication and networking, Bandwidth requirements of different media, Real time constraints: latency, video data rate, Multimedia over LAN and WAN, Multimedia conferencing, Video-on-demand broadcasting issues

Unit - 6 [4 Hours]**:** Basics of multimedia retrieval, Content Based Image Retrieval (CBIR), Key technologies and issues in current CBIR systems

3. Course Outcomes (Unit wise):

I. Ability to describe the types of media and define multimedia system
II. Ability to describe the process of digitizing (quantization) of different analog signals (text, graphics, sound and video).

III. Ability to use and apply the compression techniques for image, video, sound and animation.

IV. Ability to apply the knowledge of multimedia communication and retrieval in practice.

V. Ability to apply acquired knowledge in the field of multimedia in practice and independently continue to expand knowledge in this field.

4. Text Books:

- Ze-Nian Li, and Mark S. Drew, “Fundamentals of Multimedia”, PHI Learning.

5. Reference Books:

- Fred Halsall, “Multimedia Communications: Applications, Networks, Protocols and Standards”, Pearson.
- Khalid Sayood, “Introduction to Data Compression”, Elsevier Publication.
- Asit Dan and Dinkar Sitaram, “Multimedia Servers”, Elsevier, 2006.